Research on the production of planting material and flowers cut by gerbera in different variants of hydroponic culture

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MATERIALS AND METHODS

- The experiment was carried in greenhouse conditions at University of Agronomic Sciences and Veterinary Medicine of Bucharest, Romania. We used three gerbera cultivars: ‘Dune’, ‘Blind Date’ and ‘Balance’.

‘Dune’ *‘Blind Date’* *‘Balance’*

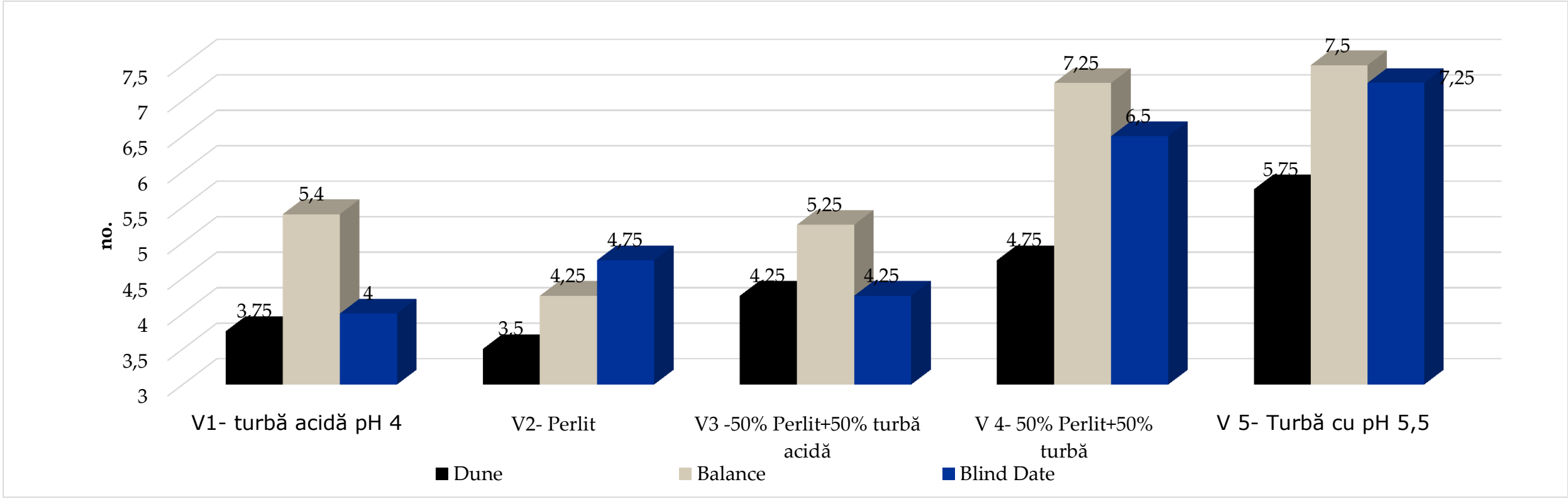
The types of substrate used for every cultivars were following: V1 - peat with pH 4; V2- peat with pH 5,5; V3-, perlite 100%; V4 -50 % perlite + 50 %, peat with 4 pH; and V5 - 50% perlite + 50 % peat with pH.5,5

We used 3 plants/replicates on every variant in block randomized.

Planting was done in pots with a capacity of 4 L filled with substrate according to experimental variants.
We recorded the amount of water and nutrient solution administered, we watched in dynamics the vegetative growth of the plants, the number of leaves and the height as well as the number of flowers formed on the plants. The care work consisted of watering, fertilization, temperature and light monitoring. Plants were fertilized with a same nutrient solution. Electrical conductivity of nutrient solution was 1,6 mS and pH 5.5.
In a period of 8 months, some quality and quantity characteristics of plants and flowers were recorded such as number of leaves, number of flower, flower stem height, flower diameter, stem diameter.

The temperature from greenhouse was 20-33 °C and relative humidity were 50-60%.

RESULTS AND DISCUSSIONS



Number of leaves on plant in May

In May, the number of leaves on the plants was different depending on the variety and the type of substrate. The lowest number of leaves was recorded for the Dune variety between 3.5 leaves on the perlite substrate and the highest for the Balance variety grown on the perlite substrate

‘*Dune’* gerbera plants - in May

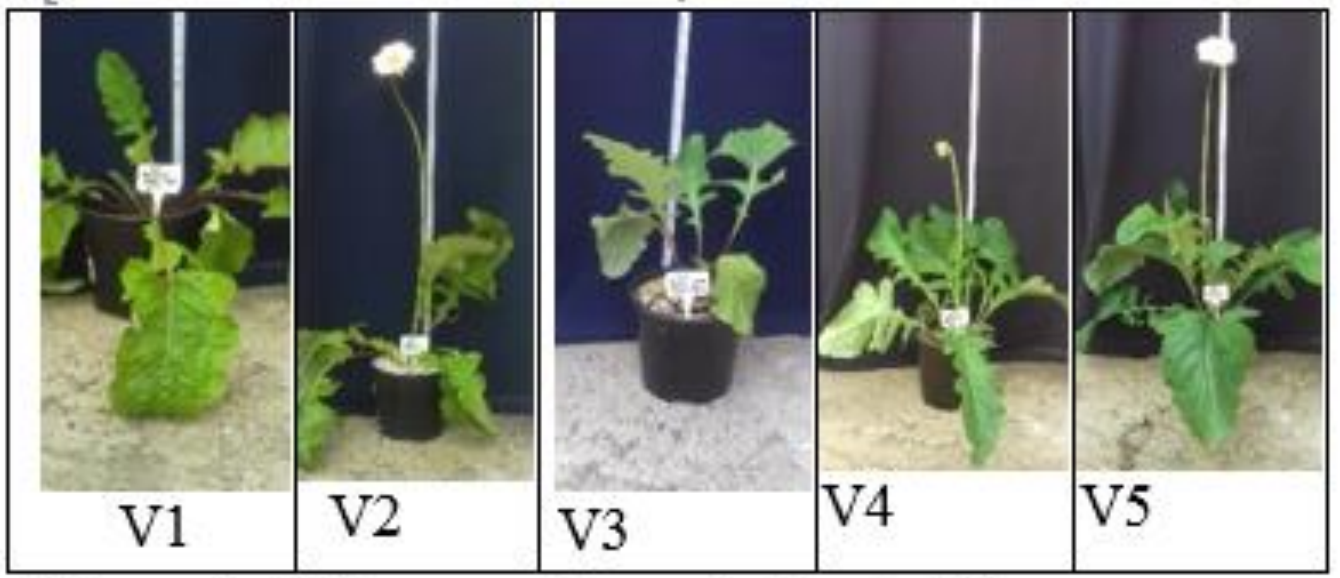


Figure 4. Balance gerbera plants - in May

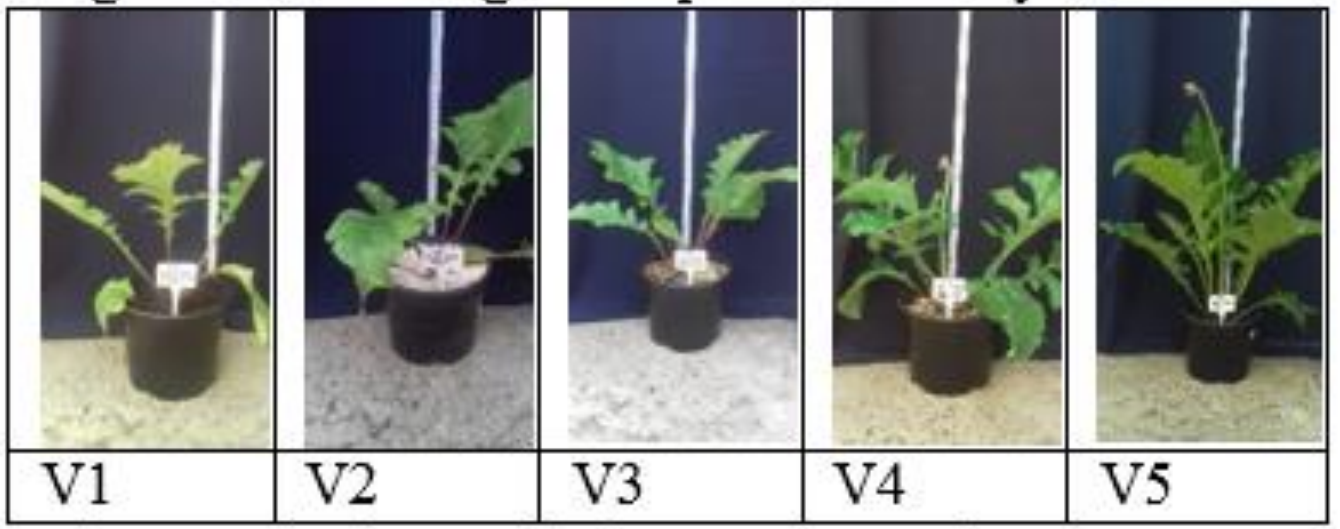
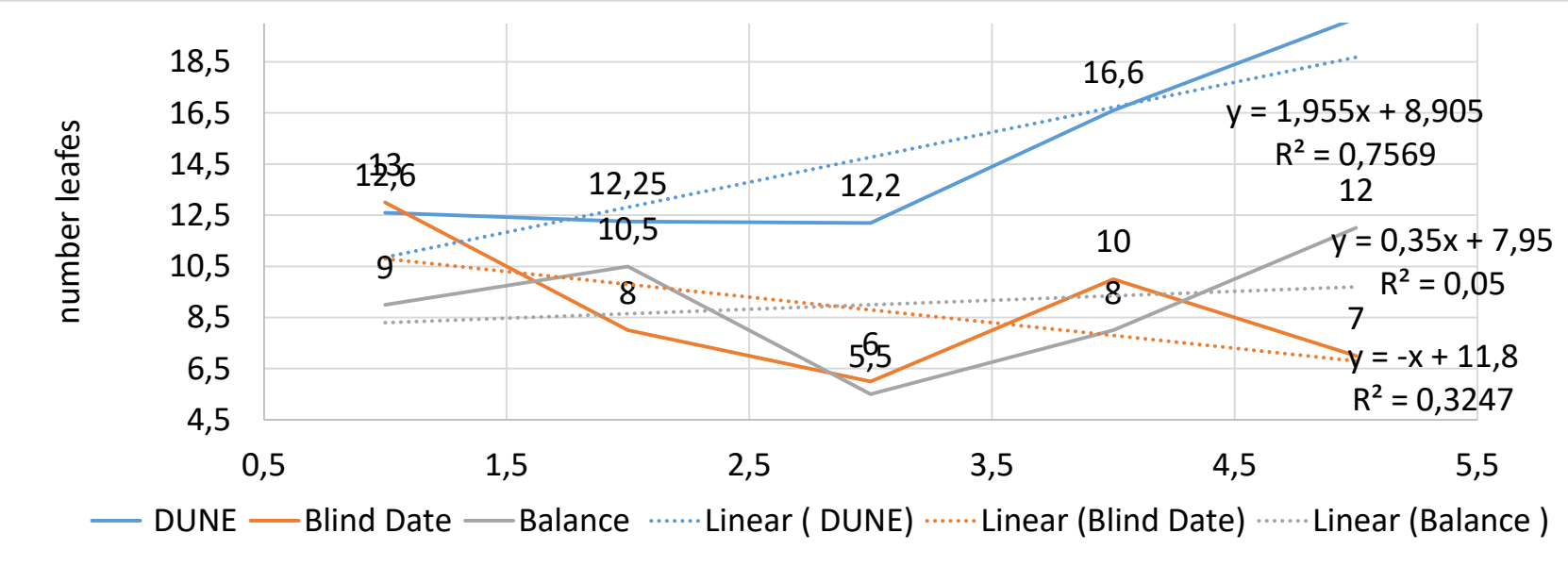


Figure 5. Gerbera Blind Date plants - in May

Number of leaves on plants



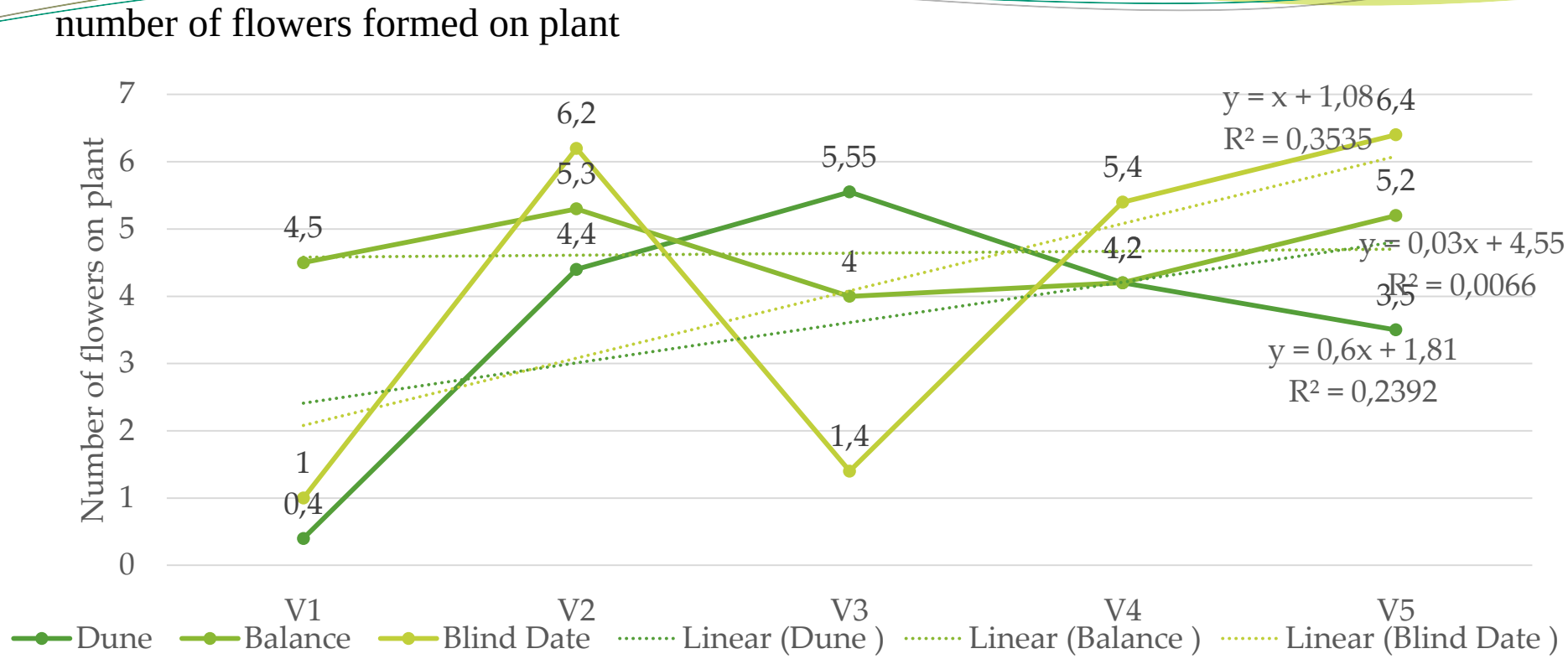
If we analyze the behavior of the varieties according to the type of substrate we found that in the case of acid peat substrate with pH 4 (V1) for the Balance variety the lowest average total number of leaves was 9 leaves on plant with a percentage of 78.03% below the average of the varieties calculated on each substrate variant. In the case of variant 5 we also found that the Dune variety showed the highest number of leaves compared to the Blind Date and Balance varieties.

The number of leaves on plant and the percentage differences to the Control variant

Type of substrate	Dune		Blind Date		Balance	
	No.	% to control	No.	% to control	No.	% to control
V1	12,6	62,4	13,0	185,7	**9,0**	75,0
V2	12,3	60,6	8,0	114,3	10,5	87,5
V3	12,2	60,4	6,0	85,7	5,5	45,8
V4	16,6	82,2	10,0	142,9	8,0	66,7
V5	20,2	100,0	7,0	100,0	12,0	100,0

V1- acid peat pH 4; V2 –Perlite; V3 -50% Perlite+50% acid peat;
V4- 50% Perlit+50% turbă; V5 - Peat pH 5,5 (Ct)

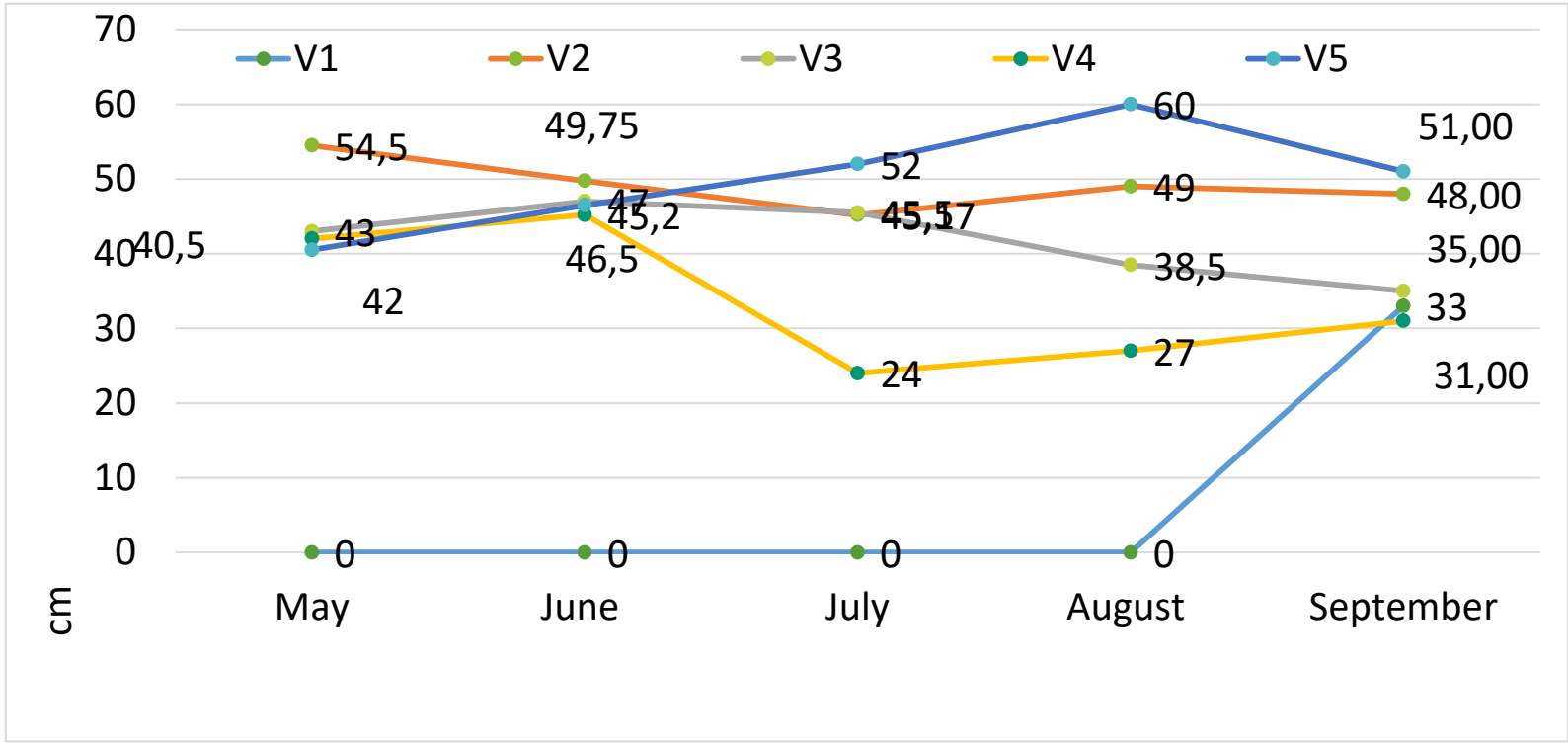
If we analyze the behavior of the varieties according to the type of substrate we found that in the case of acid peat substrate with pH 4 (V1) for the Balance variety the lowest average total number of leaves was 9 leaves on plant with a percentage of 75.0% below the average of the varieties calculated on each substrate variant. In the case of variant 5 we also found that the Dune variety showed the highest number of leaves compared to the Blind Date and Balance varieties.



Analyzing the average number of flowers formed on plant in the three cultivars, we found that they reacted differently depending on the type of substrate. We noticed that the Dune cultivar grown on acid peat substrate pH 4 (V1) showed the lowest number of flowers formed on plant of 0.4 flowers / plant followed by the Blind Date variety with 1.0 flowers / plant at V3 and the Balance cultivar behaved very well on this type of substrate forming on average 4.5 flowers / plant (V1).

All gerbera cultivars grown on perlite (V2) substrate formed a large number of inflorescences on plants of 4.4 flowers in the Dune variety, 5.3 flowers in the Balance variety and l6.2 flowers in the Blind Date variety. Analyzing the influence of the substrate type, we found that the correlation coefficients were for the Blind Date cultivar R2 = 0.3535, for Balance 0.0066 and for Dune $R^2 = 0.2392$

Inflorescence height during May-September at Dune cultivar

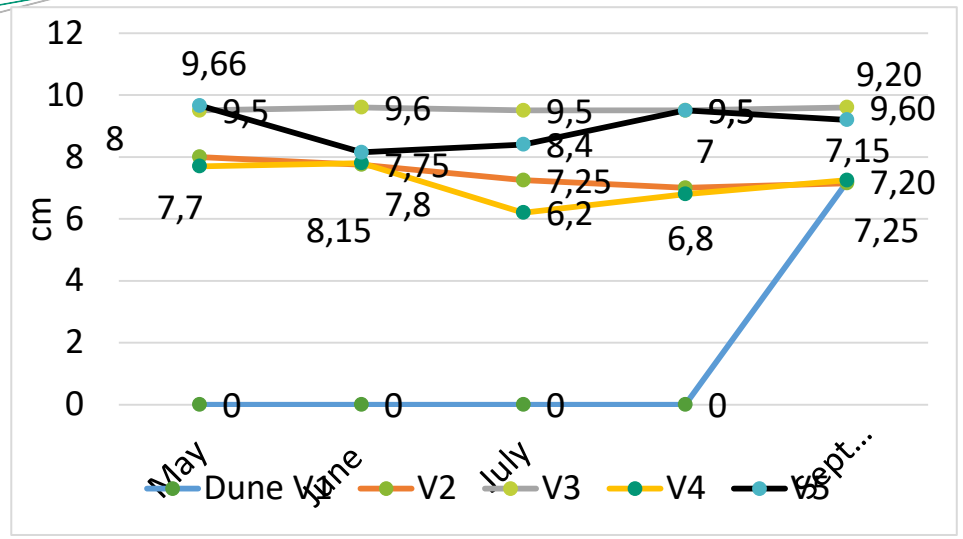


In the case of the Dune variety, we found that, for the substrate variant where we used acid peat (V1), no flowers formed in May, June, July and August, but only in September. The height of the floral stem was 33 cm. In the case of the rest of the substrate variants, we recorded heights of 40.5 cm at V5 and 54.5 cm at V2. The lowest heights of floral stems were recorded at V4 - a mixture of 50% perlite + 50% peat with pH 5.5 in July, August and September. Compared to the Balance and Blind Date varieties, the Dune variety obviously reacted to the high values of temperatures during July-August above 34°C and low relative humidity below 50%. It should be noted that on the peat substrate with a pH of 5.5 the flower stalks had heights of 40.5 cm in May and 60 cm in August

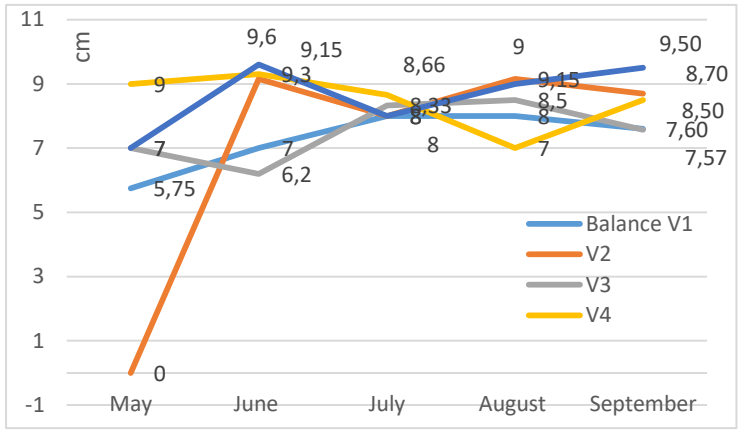
Influence of inflorescence height on varieties and months and type of substrate

Cultivar	Var.	May	June	July	Aug.	Sept.
Dune	V1	0	0	0	0	33
Balance	V1	17	19	14	12	15,50
Blind Date	V1	0	0	33	28	26
Dune	V2	54,5	49,75	45,17	49	48,00
Balance	V2	0	51	12	54,5	46
Blind Date	V2	0	24,6	39,5	41,5	31,00
Dune	V3	43	47	45,5	38,5	35,00
Balance	V3	29,5	26,5	35	32,5	31,00
Blind Date	V3	0	46	0	0	36,00
Dune	V4	42	45,2	24	27	31,00
Balance	V4	67	36	41	45	40,00
Blind Date	V4	0	52	52,66	32	41,00
Dune	V5	40,5	46,5	52	60	51,00
Balance	V5	41	47,67	46	52,5	46,79
Blind Date	V5	0	40,5	48	50,5	37,00

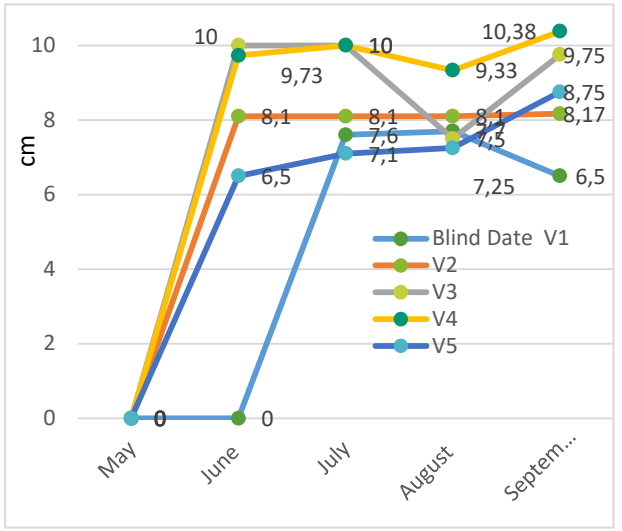
The diameter of inflorescences at Dune cultivar



The diameter of inflorescences at Balance cultivar



The diameter of inflorescences at Blind Date



CONCLUSIONS

The number of leaves on the plants was different depending on the variety and the type of substrate
The length of the leaves varied from cultivar to cultivar.

The number of flowers per plant was relatively constant for the Balance variety in May-September, being between 4 flowers / plant at V3 and 5.2 flowers / plant at V5. The Blind Date variety showed the greatest reaction to the type of substrate.

The height of the flower stalk was different depending on the variety, but it differed a lot in some varieties depending on the very high temperatures during the summer.

The diameter of the flowers was smaller for the Dune variety in the case of variant 4 and almost constant for V5. In the Balance variety, the diameter of the flower was 5.75 at V1 and 7.6 cm at V5. Flowers with the largest diameter were obtained from the Blind Date variety.

The culture substrate had influenced the diameter of the flower it varied from one month to another.

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Thank you for your attention!